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ABSTRACT

This monograph on facilities renewal at small colleges offers six case studies illustrating how these small private colleges and universities managed and funded deferred maintenance. The case studies were all written by facilities directors from institutions that developed innovative strategic plans to revitalize their physical plants. The first of the six descriptions tells how the University of Scranton in Pennsylvania developed and implemented a 5-year facility maintenance and improvement program covering prevention measures, funding, and inspection and monitoring. The second case describes how Saint Olaf's College in Minnesota developed a large deferred maintenance problem and handled several million dollars of work that had to be done in a short time. The third study discusses how Swarthmore College in Pennsylvania used a project management firm to reduce maintenance backlogs. The next chapter explains how Saint Mary's University in Texas managed the renovation of a key campus building. The following paper details how incoming president of Colorado College, Gresham Riley, continued that school's tradition of comprehensive planning and facilities support. The final report discusses how to successfully develop and present a plan for facilities renewal to board members. A 42-item bibliography containing items from 1979 to 1991 is included. (JB)

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Acknowledgments

The $60 billion deferred maintenance backlog on America's college and university campuses has been a recurring topic in APPA's educational programs and publications for several years. This monograph represents another attempt to provide some solutions to this serious problem. Our hope is that the successful methods at the small schools represented here can be adapted by institutions of all sizes.

APPA gratefully acknowledges the contributions of the authors whose work appears in these pages. We also appreciate the support of the authors' institutions and organizations for their involvement in APPA. Without them this publication would not have been possible.

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Introduction

Richard F. Rosser

The financial pressures now facing all of higher education are especially acute at small institutions, particularly small private colleges and universities, which often do not have the comparable state support or large base of alumni that give other institutions and large research universities a fighting chance. At the same time, there is ever-increasing competition within the higher education community for students and funding.

While deferred maintenance is not a top budget priority like student aid, faculty and staff salaries, or scientific equipment, it has an equally important impact on the recruitment and retention of students.

The six case studies included in this monograph all come from small private colleges and universities across the country. Each of these institutions developed an innovative strategic plan to revitalize its physical facilities through managing and funding deferred maintenance. Every type of institution will be able to gain insight, information, and inspiration from their stories.

Many institutions have been forced to defer some necessary maintenance and facilities upgrades to keep budgets in line while maintaining faculty salaries and financial aid programs at the levels needed to provide a high-quality education.

While student aid is a wild card in any private institution's budget, it is an essential first priority, along with faculty and administrative salaries. Independent colleges and universities must devote increasing proportions of undergraduate education and general expenditures to student financial aid. This year alone, private colleges and universities provided approximately $4 billion in financial aid from their own resources to help students meet their education expenses and to remain competitive with state-supported institutions. Faculty at private institutions are still paid less in real dollars now than they

were paid in 1972, and less than faculty at state colleges and universities, in every academic rank.

In addition, many small private colleges (as well as a number of small public institutions) are more than fifty years old. Their aging facilities were built over decades, and are in all stages of disrepair. These institutions face not only deferred maintenance, but also skyrocketing costs for renovating science and other facilities to keep up with state-of-the-art technology, new building codes (including the requirements of the 1990 Americans With Disabilities Act), safety and health regulations, animal rights concerns, and others.

Two factors play key roles in any discussion and action plan to manage deferred maintenance. In today's highly competitive higher education market, institutions find it necessary to present a striking first impression of the campus to prospective students and their parents, trustees, and major donors. While a student's choice of institution might not necessarily be based upon the condition of its buildings, it has been demonstrated repeatedly that an attractive campus is important in recruiting and retaining students, fundraising and volunteer activities, and creating a positive environment for learning.

Another factor is the increased consumerism that we now find on our campuses. Given the high cost of education that students and their parents must pay, expectations are higher than ever. Students and parents are casting a critical eye not only upon the college's academic program and reputation, but also on the computer center, athletic facilities, laboratories, health center, residence halls, classrooms, and dining halls. Are they getting what they're paying for?

Clearly, the most important action a college can take is to evaluate its true needs for facilities renewal, determine what it will cost to address those needs, identify priorities, and adopt a plan to accomplish the task. This approach will address those needs while taking into account the institution's educational mission and financial stability.

Planning for Healthy University Facilities

John S. Flanagan

Many colleges and universities face deteriorating facilities because administrators all too often take the easy approach: "Defer the project, we'll fix it next year." But ignoring plant needs to satisfy and accomplish highly visible academic programs and other enchanting non-plant programs adversely affects the institution's future educational and financial stability.

Whether or not campus facilities remain healthy and usable depends upon institutional recognition of the problem of deterioration and obsolescence, and on allocating sufficient resources to maintain facilities essential to providing an adequate educational environment.

In order to provide a reasonable basis for the allocation of resources, administrators must develop and implement a systematic plan of action to determine what needs to be done, what it will cost, and when it should (or can) be accomplished. Many members of the college community, however, are not concerned about needs they cannot readily see or that do not directly affect them. Projects involving utilities, roofs, heating and ventilating systems, and supporting structures are often easy for administrators to ignore. Many find it convenient to ask for more detailed justification as a way to avoid difficult decisions.

Ignorance is bliss; that is, until the walls, roofs, cornices, and mechanical systems collapse. Then it costs a small fortune to rebuild or replace, rather than repair, the facility. Funds for ordinary repair and maintenance of facilities to keep them attractive and usable also suffer when competing with highly visible, snappy programs.

HISTORY OF THE PLAN

In the late 1970s, the University of Scranton developed and implemented five-year facilities maintenance and improvement programs. Our campus facilities development plan of action is the result of a continuous process whereby we systematically arrange essential elements of information necessary to accomplish university goals and objectives. This process involves three plans:

1. The annual facilities maintenance plan (FMP) for annual current fund plant repair and maintenance items. These are ordinary building repairs and maintenance to preserve existing facilities in a serviceable condition and to prevent the buildup of deferred maintenance.
2. A facilities improvement plan (FIP) for projects through the capital budget. These are requests that renovate or modify facilities, or require new facilities, and that involve space renovations and support for grants.
3. A three-year list of potential deferred maintenance projects.

We developed these coordinated plans of action to support the goal of academic excellence, and to enhance the institution's ability to continue to attract students over the long haul by maintaining a functional, safe, and attractive campus. The goals of these plans are to maintain an attractive, functional, well-maintained, and well-planned physical plant that will improve our academic and economic attractiveness.

PREVENTION IS THE BEST MEDICINE

Because of these persistent and aggressive plans, the University of Scranton technically has no deferred maintenance backlog. Still, the university has developed a schedule of potential ongoing preventive maintenance projects covering a three-year period. This list enables us to avoid buildup of actual deferred maintenance through a forward-looking facilities repair and maintenance program.

Surveys are performed each year to determine departmental requirements that have an impact on physical plant. All requests are processed through normal organizational budgetary channels (departmental chairpersons or directors and budget supervisors). In this way, students and academic and administrative departments are involved in developing campus facilities budget plans.

After consolidating and tabulating facilities requests, we identify

priorities, allocate resources, and defer or eliminate projects. Administrators are consulted in each major division to ensure that program and capital project requests are consistent with the overall mission priorities of their divisions. As the university budget is prepared and refined, adjustments to the budgets may be necessary. After the macro budget is approved by the board of trustees, the operating and capital budgets are revised, adjusted, and published.

To develop a practical and useful physical plant repair, maintenance, and improvement program, in early August each year the university community is notified to review and submit program-justified facility requests through appropriate channels. This notification provides an explanation of the program and what it hopes to accomplish. It sets forth a general schedule of events, solicits input, and indicates the name and location of the program coordinator. This communication includes appropriate forms and instructions, along with a reminder of the suspense date. In addition, a small team of physical plant personnel visits each facility and gathers repair and maintenance data.

In October, projects are defined, costed, and tabulated into a working draft according to budget code, location, repair and maintenance or capital project, space requests, general campus, OSHA, handicap, emergency, future projects, and other items. These items are listed in descending order according to dollar cost, and deferred items from previous years are also included for reconsideration. An executive summary is prepared that highlights the major categories of the report, including project areas, previous and current year requests and approvals as compared to future year requests and recommendations, and other significant items of interest.

We have found it effective and realistic to develop actual projects based upon continuous inspections, academic program requirements, annually updated long-term plans, and adherence to a financial ratio of allocation of current fund budget resources to repair and maintenance projects. Until June 1991, we used a ratio of 2 percent of the annual operating budget. (Given recent guidelines, the university plans to shift to a modified version of funding our plant maintenance and improvements/adaptations to a percentage basis of the plant replacement value.[1])

The university has also found this program to be useful in preparing grant and foundation proposals directing and controlling purchasing and contracting activities, budget performance and analyses, and other areas. It also provides a basis for scheduling production

work loads, establishes channels of communication, provides a procedure for reviewing unprogrammed requirements, and assists the institution's safety board and affirmative action, planning, and financial management committees.

FUNDING

In order to maintain existing facilities in a serviceable condition and to keep deferred maintenance under control, we fund the FMP at a level of 2 percent of the annual budget. Effective June 1991, we will shift to the guidelines recommended by SCUP. We have developed this formula for repair and maintenance funds over the past ten to twelve years and have found it effective. An important element of the University of Scranton plan that distinguishes it from many other preventive maintenance programs is that we include adequate staffing, compensation, organization, and management in the program.

We have had a long-range goal of professionalizing our campus facilities management team and, while it has been a slow process, we are approaching our goal. Professionalization involves developing a proper organization with positions staffed by qualified persons, emphasizing managerial skills, to carry out goals and objectives of campus facilities programs. Professionalization on our campus has involved the following activities:

- Establishing correct missions and functions.
- Establishing the proper balance of job descriptions (professionals, managers, tradespeople, mechanics, etc.).
- Automating systems and processes, such as work orders, computer-assisted design and facilities management programs, etc.
- Developing performance and productivity standards.
- Developing experience ratios for funding and cost estimating.

A few key positions remain to be professionalized, and we expect those to be accomplished within the next three to five years. To a person, our university administrators and board of trustees recognize and support our campus facilities program.

INSPECTION AND MONITORING

Our preventive maintenance management program is a systematic and planned program of actions to retain facilities and equipment in serviceable operating condition. It includes inspection; testing; adjustment; servicing; calibration; fabrication; replacement of modules

and/or components; repair, overhaul, and rebuilding equipment when scheduled; and the judicious use of cannibalization of obsolete and surplus equipment.

There is no better management technique to ensure performance of goals and objectives than a comprehensive inspection/monitoring program. We employ a comprehensive inspection program, custodial inspection and performance checklists, and a reporting system. Our inspections take place during the night and over the weekend as well as during normal business hours, and include the following components:

- Restrooms.
- Graffiti.
- Resident housing.
- Security lights.
- Asbestos and other hazardous substances.
- Life support equipment and exits.
- Fire/smoke alarm systems.
- Intrusion alarm systems.
- Electric and HVAC systems.
- Tripping hazards.
- Potholes.
- Fungus growth in water towers and HVAC systems.
- Pest/rodent control.
- Storm and other natural disasters, and post-storm inspections.

In addition to these routine inspections, annual safety inspections are performed in the residence halls, and special attention is paid to the routes that prospective students and their parents follow when touring the campus. Productivity and performance reviews are conducted weekly by plant managers with biweekly reviews at the vice president level.

CONCLUSION

The University of Scranton finds that this program works well and serves many purposes. We believe it will continue to help the institution maintain a modern and attractive educational environment essential to the maintenance of our future stability. It is our case for controlling the buildup of deferred maintenance, and we consider it our opportunity to keep our facilities attractive and usable for years to come.

NOTES

1. These guidelines appear in John A. Dunn Jr., *Financial Planning Guidelines for Facility Renewal and Adaption* (Society for College and University Planning: Ann Arbor, Michigan, 1989).

Improving the Funding Commitment

Peter Sandberg

St. Olaf College is a highly selective four-year liberal arts college affiliated with the Evangelical Lutheran Church of America. The campus is located in Northfield, Minnesota, about thirty-five miles south of the Twin Cities metropolitan area. Of the 3,030 full-time students enrolled, nearly 2,800 live on campus. Our campus buildings, situated on 1.6 million gross square feet of space, are primarily masonry construction and skinned with distinctive Faribault and Lannon limestone. Pitched roofs are slate and copper; many buildings retain leaded windows.

The campus grounds feature wide expanses of athletic and recreation fields that contrast with woodlands and the park-like campus proper, with its mature trees. Approximately 300 acres are mowed. Adjacent agricultural lands owned by the college are slowly being reclaimed and placed in conservation programs. Some of these lands are being reforested, planted with native prairie grasses, or restored as wetlands to prevent uncontrolled runoff and provide wildlife habitat.

Things generally look good. The first impression is of a cozy, enveloping, supportive environment that can enhance the educational experience for students and faculty. Our physical plant staff has a reputation on campus for being service-oriented and generally able to meet any need that the faculty and administration might have. So what's the problem?

THE SEEDS OF THE PROBLEM

Like many other campuses, St. Olaf experienced a great deal of growth following World War II. Many buildings were constructed between the mid-1950s and late 1960s. While the college was some-

what strapped by the initial expense of meeting its facility requirements, there was some room in operating budgets for funds that would pay for major life-cycle expenses such as roofs and mechanical systems.

During the 1980s, however, dramatic enhancements to the academic program at St Olaf were sometimes achieved by asking all areas of the college to tighten their belts. The physical plant department gave as much as anyone, and annual budgets that had been able to fund some types of life-cycle projects became stressed to the point that repair and improvement accounts were limited to handling only day-to-day maintenance operations. Things kept running, but physical plant was forced to start reacting to problems rather than planning for their timely abatement.

Today we are faced with acres of roofs that are reaching (or exceeding) their life expectancy. Some mechanical systems are no longer adequate for the programs they are supporting twenty-five years after their design. Thousands of square feet of our distinctive limestone walls are overdue for pointing and cleaning. The combination of these systems reaching the end of their useful life, along with reduced maintenance budgets, has left us with several million dollars worth of work that should be done as soon as possible.

ADDRESSING THE FUNDING ROADBLOCKS

Obtaining funding for this deferred work is made difficult by several factors. For one thing, problems that facilities professionals lose sleep over are often out of sight. Regents arriving on campus for their spring board meeting stroll through the campus among mature trees, flower beds, and seemingly ageless buildings. It is difficult to sell the concept of a deteriorating campus in this environment.

Another obstacle is the competition for dollars with nationally significant academic programs seeking better support for their offerings. This fiscal competition needs to be respected. Physical plant cannot hope to compete unless our presentations are well documented, concise, easily understood, and fairly dramatic without sounding shrill. Whining will get us nowhere.

We decided to take a proactive approach. First, we felt that it was essential to maximize available maintenance funds. Asking for additional funding would be easier if we were well prepared to defend our present allocation. As part of this process, we computerized our physical plant office functions. The simultaneous introduction of a

new chart of accounts and enhanced reporting by our business office provided us with better feedback and control. Plant maintenance budgeting and charge-out procedures were computerized along with the work order system.

These improvements helped us in several ways. First, subjectivity in maintenance budgeting was reduced by converting to a formula distribution of funds based on use of space. Second, the work load was tracked and managed more efficiently, making it easier to adjust funding levels in subsequent years. Third, our internal recording and charge-backs are now available in greater detail, making justification of allocations much easier.

The next step was to define deferred maintenance. What did the term mean on our campus? For our purposes, we decided that deferred maintenance would consist only of actual repair work related to the structure and environmental systems of buildings and grounds that had not been performed because of financial considerations. In order to keep the scope of the problem tightly defined, we purposely excluded from our definition problems resulting from changes in programs housed in individual structures.

For example, our science center is running basically as designed twenty-five years ago. No major repairs due to mechanical or electrical problems are required at this time. However, the programs and associated equipment have changed so much over this period that our environmental systems are stressed to the maximum. While this is a major difficulty, it is not deferred maintenance according to our definition. Rather, it is a program problem that should trigger a renewal project for the building.

We are trying to sell the concept of planning for renewal and life-cycle repair and improvement separately from the maintenance problems that have already been deferred. Without a commitment from our regents to address this separate but related problem, renewals would continue to be deferred. We made the decision to sell this concept as a related issue in order to keep our proposal as simple as possible.

ORGANIZING THE DATA

Time was an issue for us. The board was pressing for a quantification of the problem so that they would have a clear idea of what we were trying to sell. We discovered that we had a great deal of information on hand, but it had never been organized in a way that could be

presented as a package to be financed.

Detailed analyses of roofs, hard surfaces, and mechanical and electrical systems were available. Our tuckpointing crew had prepared a status report of the condition of building exteriors. We determined that improvements to interior finishes would remain with building repair and improvement funds, or separately funded program-related projects in most cases. We also decided that our general study did not require a room-by-room facility audit. However, we are working on such a study that will help us to plan for updates in these spaces as they come due. Figure 1 is the work sheet that has been developed from our space inventory data base.

After examining all this information, it seemed as though we had most of what was needed to fit our definitions. Organization, pricing, and presentation became our next problem. Using prices from recently bid projects and estimates from reliable contractors, we established unit prices for many types of work. These were used to quantify whole areas of work. For example, we developed a constant for reroofing flat, built-up roofs and included a percentage to cover design, inspection, and so on. This was applied to the schedule determined by our roof analysis, in 1988 dollars. Each situation was entered into a data base that included the deferred maintenance item, schedule, cost in 1988 dollars, and inflation factors. The data base also included a field for reevaluating the problem based on new information, a provision for accounting for work completed, and a field specifying the current projected cost, including inflation and work accomplished. Figure 2 is an example of the data base form. This data base was used to generate a comprehensive report that could be used as a presentation tool during our vice president's report to the board. A portion of this report is shown in Figure 3.

Presentations to senior management need to be as concise as possible. We really cannot expect them to fight their way through page after page of information and documentation. Our case needed to be made dramatically and briefly to keep the attention of the board while they tried to balance a wide range of serious demands.

The entire chart represented by Figure 3 took up only two typewritten pages, but it included all the information that the board really needed to make a funding commitment. This format is easy to update, and the report is now included at each board meeting so that progress can be tracked and members can follow the impact of the funding decisions they make.

Along with this demonstration of the physical needs, the vice

FIGURE 1
Facilities Space Audit

```
BUILDING: Flaten              DEPT: Art           FUNCTION: Instruc.
ROOM #: 42                    SQ FT: 384          PROGRAM: 11
ROOM TYPE: 110                USE: Classroom      NO. SEATS: 28
FIXED SEATS ?: N              NFPA OCCUPANCY: 19.2
FLOOR: CARPET                 CONDITION: G                SCHEDULE: 1996
CEILING: PLASTER              CONDITION: E                SCHEDULE:
PAINT: OFF-WHITE              CONDITION: P                SCHEDULE: 1991
LIGHTING: 4 FOOT FLUOR.       CONDITION: G                SCHEDULE:
WINDOWS: WOOD THERMO          CONDITION: P                SCHEDULE: 1991
WINDOW COV: SHADES            CONDITION: P                SCHEDULE: 1991
CLASS FURN: TABLET ARM CHAIRS CONDITION: G                SCHEDULE: 2000
OTHER FURN: TEACHING STATION  CONDITION: G                SCHEDULE: 1996
BOARDS: SLATE                 CONDITION: E                SCHEDULE:
SHELVING: NONE                CONDITION:                  FEET:
HEAT: FIN-TUBE RAD.
AIRCONDITIONED? (Y/N): N UNIT VENTILATOR OR AIR-HANDLING?: N
                       E= Excellent G= Good P= Poor
```

president had to develop a package demonstrating the feasibility of actually abating the deferred maintenance backlog, as well as adequately funding maintenance budgets to assure the board that future work would not have to be deferred. A schedule was prepared that showed the deferred maintenance requirements being remedied over roughly ten years. This was presented with a request for $75,000 the first year of the program. We requested that this amount be doubled each of the first four years until we were able to sustain an annual funding level of $500,000 to $600,000 dedicated to the backlog existing at the time of the initial request. We felt that this level of work was manageable, given our overall program of new construction, program-oriented remodeling, and renewals. Our staff would be hard-pressed to do a good job managing much more than this amount of work each year while balancing other requirements.

At the same time, funding schedules were prepared for annual repair and improvement budgets. They demonstrated that we could avoid deferring these problems in the future when we again reach adequate funding levels. We created a graph that showed deferred work decreasing in proportion to an increasing line for deferred

FIGURE 2
Data Base Form

```
BUILDING: SPEECH THEATER    PROBLEM: PAINT & WINDOWS

'88 VALUE: $3750.00
1988-90 INFL: $4125.00
RE-EVAL.: $35000.00
'90 VALUE: $35000.00
'91 VALUE: $36925.00

YEAR ABATED:                VALUE:
YEAR ABATED:                VALUE:
YEAR ABATED:                VALUE:
YEAR ABATED:                VALUE:

WORK: $0.00
NET: $36925.00
```

FIGURE 3
Deferred Maintenance Report

PROBLEM	BUILDING	'88 VALUE	RE-EVAL.	'90 VALUE	'91 VALUE	WORK	NET
ELECTRICAL	THORSON	$200000.00		$220000.00	$232100.00	$0.00	$232100.00
	MELLBY	$200000.00		$220000.00	$232100.00	$0.00	$232100.00
Total:		$400000.00		$440000.00	$464200.00	$0.00	$464200.00
HARD SURFACE	CAMPUS	$492500.00		$541750.00	$571546.25	$73000.00	$498546.25
Total:		$492500.00		$541750.00	$571546.25	$73000.00	$498546.25
LIFE SAFETY	HOYME	$45000.00		$49500.00	$52222.50	$0.00	$52222.50
	KILDAHL	$25000.00		$27500.00	$29012.50	$0.00	$29012.50
	MELLBY	$80000.00		$88000.00	$92840.00	$0.00	$92840.00
	HILL KITT	$60000.00		$66000.00	$69630.00	$0.00	$69630.00
	BOE CHAPEL	$15000.00		$16500.00	$17407.50	$0.00	$17407.50
	STEENSLAND	$7500.00		$8250.00	$8703.75	$0.00	$8703.75
	OLD MUSIC	$15000.00		$16500.00	$17407.50	$0.00	$17407.50
	MOHN	$45000.00		$49500.00	$52222.50	$0.00	$52222.50
	LARSON	$45000.00		$49500.00	$52222.50	$0.00	$52222.50
	THORSON	$80000.00		$88000.00	$92840.00	$0.00	$92840.00
	ELLINGSON	$45000.00		$49500.00	$52222.50	$0.00	$52222.50
Total:		$462500.00		$508750.00	$536731.25	$0.00	$536731.25

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maintenance funding, while the amount of work being deferred decreases in proportion to the increased level of annual maintenance funding.

PRESENTING THE CASE FOR FUNDING

Our initial presentation allowed board members to focus on the problem we face and to visualize the impact that inadequate funding would have on the educational experience of our students and faculty. Each updated presentation of the report allows them to track the progress of the problem and see the impact of the funding levels to which they commit.

The bottom line for all of us is adequate support for and enhancement of the college experience. We take pride in the role that St. Olaf has in higher education because of its relationship with the church and the high quality of the liberal arts program. We feel that our operation is performing a stewardship of resources, and are well aware of the importance of our support to the mission of the college.

Since the original presentation of the plan to the board, there has been a great deal of discussion regarding conceptual approaches to funding with the backlog. Our board, like most, is composed of people from a wide range of backgrounds. We have pragmatic business and industrial leaders and pastors of the church, women and men, young and old, each with a different frame of reference. Some want to greatly enhance annual budgets, thus simplifying accounting by handling deferred projects through these lines. Others would like to keep the deferred projects separate, while committing to smaller increases in annual funding. These are decisions for our administration and board to make, and for us to live with. As long as we can continue to keep their commitment alive by presenting them with easily understood and quantifiable information, we will be happy to work within any framework they present us.

THE PAYOFF

At this point, the funding for this program has been increased to $250,000 for the upcoming fiscal year. We also have been able to redirect funding from other programs to help chip away at the backlog.

By setting priorities for projects that will resolve deferred maintenance problems as part of the scope of the work, we are anticipating

that we will have a total of about $500,000 available in the upcoming fiscal year. This commitment from our administration and board has been extremely gratifying, and signals an increased awareness of the costs associated with deferred maintenance.

Reducing Backlogs With a Project Management Firm

C. Stuart Hain

Committed to reducing its backlog of deferred maintenance, Swarthmore College is currently engaged in an ambitious program of catchup with the involvement of a project management firm. This program was developed after careful and intense college-wide self-evaluation, a tradition at Swarthmore, which included the facilities budgeting process. With the strong backing of the board of managers, the administration used the review of the facilities budgeting process to develop a framework whereby the tangible buildings and grounds assets of the college would be evaluated, deficiencies ranked according to priority, and revitalization executed. The outcome would be a strategic plan for the preservation, renewal, adaptation, and fullest use of existing capital assets. The plan, as described by the associate vice president for operations, was to be dedicated to developing and implementing a sensible, affordable, and cost-effective capital management program. The process began in the spring of 1988.

Swarthmore College, founded in 1864, is a small liberal arts college with about 1,300 students. The campus comprises 330 acres of land and 1.2 million gross square feet of building space. The functional distribution of the buildings is as follows:

Function	*Number of Buildings*	*GSF*
Academic buildings	13	395,988
Residence halls	15	367,280
Support services	15	181,639
Athletic buildings	4	114,080
Administrative	2	131,016

Of these buildings, 26 percent are less than twenty-five years old, 16 percent are between twenty-five and fifty years old, and 58 percent are more than 50 years old. It is also important to note that the entire campus is an arboretum.

The following is an overview of the Swarthmore College deferred maintenance phase-out program from its inception through the early stages of the remediation activities. The areas covered include the development of the needs assessment and remediation approach, the selection process for a program management firm, and the initial work in the remediation program implementation. It concludes with a section of observations based on current experience.

When I wrote this chapter, I was employed by the project management firm, and was assigned the title of director of deferred maintenance by the college. With twenty years of experience in the construction industry, I have spent most of my time renovating and constructing new facilities for institutional clients. As a member of the program management team, I was not involved in the early planning for the development of the needs assessment for the program. Information about the early development of the program came from documents supplied by the college and conversations with board members, past and present administrators, and staff. The documents comprised the following:

- Self-evaluation reports from 1979 and 1989.
- Facilities needs assessment prepared by a contractor.
- Request for proposal for the project, prepared by the associate vice president for operations.

NEEDS ASSESSMENT

The process of developing a plan for the effective management of physical assets began with a facilities audit. This was understood by the administration to be the critical first step in quantifying deferred maintenance needs. The objective of the study was to identify and categorize the scope and complexity of the various deferred maintenance and capital renewal projects required to bring the existing buildings up to standard. In addition, the study would provide information required to set priorities for projects.

As the college developed the deferred maintenance program, the intent of the facilities condition audit was to provide a needs assessment of each building by evaluating life/safety systems, envelope integrity, mechanical and electrical reliability, structural systems,

utility services, and surrounding grounds. During program development, the college concluded that it would be necessary to bring in a professional service to help develop the assessment because, as a small school, Swarthmore had a relatively small facilities department totally committed to providing daily facilities operations. A firm was engaged to do this work, and as it proceeded with the assessment, the administration and the college community were constantly involved to ensure that the needs of the college were taken into account, including program support, quality of life, asset preservation, and cost containment.

During the program's evolution, the framework for analysis was defined. The framework required that every discovered deficiency in each building be identified as a project and given a number. Each project was categorized by institutional need or mission within the following categories: asset preservation, academic program, student life, public interface, cost containment, or safety/statutory. In addition, each project was classified by one of the following maintenance systems:

- Shell.
- Electrical.
- Plumbing.
- Mechanical (including HVAC).
- Grounds.
- Statutory.

Projects also were assigned an estimated value, and finally each project was assigned a priority, based on the following criteria:

- Priority 1: attention required within five years.
- Priority 2: attention required between five and seven years.
- Priority 3: attention can be deferred beyond seven years.

These criteria were based upon the potential for program disruption, asset deterioration, and/or safety concerns. In addition, the firm recommended that corrections address strategic priorities campus-wide rather than correcting all problems in every building. Figure 1 is a sample of the report format.

The completed study identified the total deferred maintenance (including adaption and renewal) backlog to be valued at $34.8 million, of which $20.2 million (or 58 percent) was considered Priority 1 as defined above. From a maintenance system standpoint, the single largest area of concern was the shell—roofs, windows, pointing, caulking, waterproofing, etc. Within the Priority 1 category, the estimated value of shell repairs was $8.3 million. The next great-

FIGURE 1
Priority Project List by Building and System

Proj.#	System	Sub-system	Sub-sub-system	Description	Est. Cost	Building	Priority	Inst. Mission
** PLUMBING								
0071	PLUMBING	Waste Service	traps	repl. select. lab sink traps,drains	10900	MARTIN BIOLOGICAL LABORATORY	1	Acad Program
** Subtotal **					10900			
** COOLING								
1102	COOLING	Generation	chillers	overhaul chiller	17200	MCCABE LIBRARY	1	Asset Pres.
1103	COOLING	Generation	towers	replace cooling tower	24100	MCCABE LIBRARY	1	Asset Pres.
** Subtotal **					41300			
** PLUMBING								
1035	PLUMBING	Fixtures	toilets	replace toilets w/flushometers	14900	ROBERTS HALL	1	Asset Pres.
1037	PLUMBING	Fixtures	tubs	replace fixture valves	1100	ROBERTS HALL	1	Asset Pres.
1036	PLUMBING	Fixtures	sinks	replace basement sink	600	ROBERTS HALL	1	Asset Pres.
0667	PLUMBING	Dom Cold Water	piping	replace severely pitted cw piping	6900	SPROUL OBSERVATORY	1	Asset Pres.
0669	PLUMBING	Dom Hot Water	piping	replace severely pitted hw piping	3400	SPROUL OBSERVATORY	1	Asset Pres.
0668	PLUMBING	Dom Hot Water	storage tanks	install vacuum breaker	200	SPROUL OBSERVATORY	1	Asset Pres.
** Subtotal **					27100			
** SHELL								
0652	SHELL	Structural	termites	repair termite damage	17200	SPROUL OBSERVATORY	1	Asset Pres.
0654	SHELL	Openings	windows: sash	replace windows	23000	SPROUL OBSERVATORY	1	Asset Pres.
0657	SHELL	Interior	ceilings	add new acoustic ceilings	5800	SPROUL OBSERVATORY	1	Student Life
0655	SHELL	Interior	walls & parts	repair water damaged walls	9200	SPROUL OBSERVATORY	1	Student Life
** Subtotal **					55200			

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est area of need was in electrical and mechanical systems, which was largely due to aging or obsolescence. The following strategic priorities were identified by the firm:

- Safety/statutory.
- Space restoration.
- Mechanical obsolescence.
- Primary systems reliability.
- Envelope integrity.

The study was documented using a data base system that allowed sorts by building, institutional need, maintenance system, or priority among many others. The college was furnished with a printed version of the report and a diskette.

With the study in hand, the recognition that physical plant operations are dynamic, and the knowledge that institutional priorities and conditions change, the administration spent the next several months in an intensive review of the document. The review process included input from both physical plant administration and maintenance staff. Through the review, items from the needs assessment that had been completed by the maintenance staff were removed from the list, some newly discovered items were added to the list, and some priorities were shifted. The result was an adjustment in the dollar amount required to fund Priority 1 items from $20.2 million to $18.5 million. In addition, with the information developed during the review, a timetable was established, with the desired start in the spring of 1990 and completion in 1995. The starting time coincided with the board of managers' schedule and the time required to bring outside help on board. In the fall of 1989, based upon a recommendation from the property committee of the board, the board of managers came to a consensus that Priority 1 items, as redefined by the administration, should be funded.

IMPLEMENTATION

In its report to the board of managers, the administration pointed out that the volume and complexity of the work was too great for the present college staff to plan, coordinate, communicate, and manage. It was also clear that increasing the full-time staff of the college to manage this program would cause problems at the end of the program, when the amount of work diminished and staff would have to be dismissed. A decision was made to engage the services of a management firm familiar with construction and the facilities-related

concerns of institutions of higher education to provide "extended staff."

Selecting Extended Staff

The concept of extended staff was critical, as the on-site management team would have to work within the college community, be sensitive to the cultural issues, and be able to relate well with physical plant administration and staff. An RFP was developed and six firms were selected to compete.

The RFP delineated Swarthmore's intent to obtain the services of a company both experienced in facilities management at institutions of higher education and able to provide technical, operational project management, financial, and analytical services. The successful firm would be required to implement a program under the direction of the associate vice president for facilities and services in a way that would ensure proper integration of the program into the college's overall academic and physical plant programs. In addition, working carefully with the college community, including physical plant administration and facilities users, the successful firm would be required to perform the following tasks:

- Develop project packages in order to recognize market efficiencies and campus activity schedules.
- Prequalify and make recommendations regarding selection of design professionals.
- Develop inclusive scopes of work and compile college standards into a master specification.
- Prepare comprehensive bid packages.
- Develop contractor lists for approval and recommend contractor selection after bid comparisons.
- Develop, monitor, and maintain schedules.
- Implement project punch-out and turnover.
- Develop campus communication and contact systems to ensure community understanding and support.
- Develop effective training programs for facilities personnel.

Finally, it was made clear that the work would be addressed on a priority basis and that the goal was to ensure that the resources allocated were used in the most efficient manner possible.

Each of the six companies selected was asked to submit a written proposal addressing the issues raised in the RFP and specifically describing the approach to be taken for project packaging, schedul-

ing, staffing, site presence, systems employed, and time to be devoted to the program. Since the college believed that each company selected to compete was capable of performing the work, particular interest was focused on the personnel and organizational structure to be used by each company. This was consistent with the idea that the management team would become extended staff.

To make the selection, a broad-based committee was formed, comprising board members, senior administrators, and physical plant administrators and staff. Each committee member reviewed all written proposals, and each competitor was invited to make an oral presentation to the committee, with the primary presenters being the proposed management team. The list was shortened to two companies. The final step in the selection process required that on separate occasions the key management team members of the two finalists have lunch with the key college team members.

Integrating Extended Staff

The proposal/selection process confirmed and strengthened an idea that evolved during the evaluation of the needs assessment and RFP development: that the outside management staff would have to fit in with the current physical plant staff and provide broad technical support. The extended staff would have to develop close working relationships with members of the college staff; these relationships are integral to maximizing the impact of the dollars spent while minimizing the impact to the college community.

The framework for integrating extended staff with college staff was built by creating the title "director of deferred maintenance" for the manager provided by the firm. The director would report to the associate vice president for facilities and services—analogous to the reporting relationship of the directors of maintenance, engineering, and environmental services—and coordination would be through that group.

Along with providing what amounted to temporary technically skilled staff in a day-to-day role, the college learned that an outside management firm could also bring a broad range of skilled people to the projects as needed. For example, the management firm recognized that the complexity, scope, and time constraints inherent in the deferred maintenance program required careful and creative use of extensive technical support services. Therefore, it chose to involve one of its units extensively in preconstruction work—evaluating

early designs and dealing with cost and constructability issues to help develop the identified deficiencies into defined projects.

Every day, the director of deferred maintenance, with the concurrence of the associate vice president, made and implemented decisions to engage and disengage mechanical and electrical support staff, site supervisors, estimators, cost account support, and others, only when needed and planned for to maximize program effectiveness.

WORK PLAN AND IMPLEMENTATION

In April 1990, the selected firm was authorized to proceed. Recognizing that the summer months presented the greatest opportunity to maximize production—and that with an April start date planning time was short—the decision was made to concentrate on building exteriors during the first summer. This decision was also reinforced by the knowledge that fewer people were affected by exterior work and therefore fewer scheduling problems would be encountered, and that the study had shown that deteriorated building envelopes represented the largest dollar volume of discovered deficiencies. Extensive roof work was performed on six buildings; stone work was repaired, repointed, and waterproofed on twenty buildings; and exterior painting and caulking was performed on fourteen buildings. In addition, three buildings with serious basement water penetration problems were protected and repaired.

During this effort, a bid package was also prepared for window replacement on fifteen buildings. The window work is now under agreement with a contract value of approximately $2.5 million.

Successful coordination of all these projects has been accomplished through weekly planning meetings attended by the associate vice president, director of maintenance, and director of deferred maintenance, along with the site managers for ongoing or planned deferred maintenance work and, if required, the director of engineering and director of grounds. This group is considered the core group. The deferred maintenance team is supported by a computer that utilizes a common file server to the maintenance department. Project information is updated as necessary, and is available through the maintenance department computer network.

The work during the summer made it clear that while it had been important to get the work started, the compressed time schedule created some problems and taught some lessons. Therefore, as the

intense effort of the summer wound down, an evaluation process was implemented. The evaluation of the summer's activity showed, among other things, that the items listed in the needs assessment report were not always easy to understand and that as time had passed, some items had been completed by college staff and not reported, while other items had changed in terms of priority. One outgrowth of the evaluation is that ample time is now made available to properly review, detail, and evaluate the projects listed in the needs assessment report. This enhances the most efficient use of college resources by focusing on the all-important planning phase.

Fall and early winter of 1990-91 were primarily planning time, although some time was also spent finishing exterior work started during the summer and restoring now-dry basements into usable space. Several academic buildings have been targeted for interior work during the summer of 1991, and the planning process is extensive. The process for dealing with interior work is somewhat different, since more building users are involved. The interior work at Swarthmore involves the following components:

- Review by project manager's staff, including technical support when needed, of each delineated project identified in the needs assessment report for each building.
- Discussion of the review, by building, at the core group meeting.
- Preparation of a working list, by building, by the core group.
- Presentation of the list to building users.
- Discussion of the impact of the work and scheduling needs at meetings attended by the core group and designated building representatives.
- Modifications, as appropriate, to the working list.
- Development of a work plan, based on each building list.
- Preparation of an RFP if design professionals are required.
- Selection of designers.
- Development and approval of designs.
- Development of bid packages.
- Bid and award of packages.
- Shop drawing review.
- Scheduling.
- Procurement of long lead items.

With the heavy demands on facilities during the school term, the annual cycle will be repeated several more times: extensive construction during the summer, construction work where possible in the other seasons, and a concentrated effort on planning and buying

during the school term. Based on progress made so far, the work should be completed by 1994, a full year ahead of schedule.

OBSERVATIONS AND CONCLUSIONS

At a time when all institutions of higher education are feeling tremendous budget pressure and competition for available funds is intense, the leadership at Swarthmore College has made some important choices about facilities. Recognizing that maintenance had been deferred, a study was undertaken to identify the magnitude of facilities needs and a program established to reduce the backlog. Using a project management firm to augment staff, the college is in the first stages of a three- to five-year deferred maintenance remediation program. The early evaluations of the program are positive, and it is now clear that three elements are critical to the success of a program of this nature:

1. Establish and maintain an accurate needs assessment.
2. Develop and maintain productive relationships and effective communication.
3. Develop a training program for the continued rehabilitation of deferred maintenance items.

Experience at Swarthmore has shown that accurate, detailed information about each deficiency can save a great deal of time and effort. In some cases, the initial needs assessment at Swarthmore included some unclear descriptions of deficiencies. As a result, time and money were spent resurveying buildings trying to find or accurately identify those items. In addition, since a program to alleviate deficiencies takes place over time and constant reevaluation of priorities is required, accurate task descriptions are critical. For these reasons, it is important to establish a clear understanding of the information to be documented in the needs assessment before the assessment begins, and to follow up during the assessment to be sure that useful information is available.

While accurate needs assessment data is critical to define the work and to control costs, two elements stand out as essential to the success of the rehabilitation program when outside contractors are involved: relationships and communication. Key contractor personnel must be able to work closely and productively with existing college staff. The nature of the tasks undertaken in a deferred maintenance catchup program require that the contractor's management staff interact daily with people throughout the college community,

including line maintenance personnel, administration, faculty, and students.

When on-site, the deferred maintenance team represents the facilities management operation at the college. It is important, therefore, to select a contractor only after carefully examining the key management personnel that the contractor plans to commit to the project. The institution selection team should be representative of the entire college community and should have a clear understanding of the culture at the institution. Assuming all finalists to be equal in terms of competence, a selection should then be made based upon the best fit. At Swarthmore College, this fit is memorialized in the contract language, which includes the names of specific key personnel committed by the contractor to this project.

A constant goal in Swarthmore's deferred maintenance program, and a theme repeated throughout this chapter, is to maximize the impact of the dollars spent and minimize the impact on the campus community. Excellent communication is critical to meeting this goal. Tasks must be defined and evaluated in ways that allow college administrators to make informed decisions, users to understand task impact and schedule, facilities department management to operate in an informed and productive way, and trade contractors to price and plan based on a carefully defined scope of work.

Lines of communication must be established that consider the culture and needs of the institution. The early success at Swarthmore has been achieved through the core group doing the planning as a team. The group integrates the deferred maintenance program into ongoing college activities, and works out any impact and schedule issues with building users. In addition, duplication of effort by the maintenance staff and trade contractors are avoided by posting task operations on the maintenance department computer network. Finally, the deferred maintenance group uses all the information developed in the planning effort to prepare complete, concise, and meaningful bid packages.

Swarthmore College decided to use an outside group for a finite contract period to manage a catchup program, and recognized that while most of the backlog would be remedied this way, some items, by choice, would remain unfinished. This is usually true when an arrangement is made to have a program managed for a discrete period of time or a fixed dollar amount. If this is the case, it is important to include training as part of the contract. The skills and systems employed by the management contractor to qualify trade

contractors, group tasks, prepare bid packages, write and negotiate contracts, and schedule and manage the work are valuable and transferable. Those skills may be helpful in evaluating current in-house practices, augmenting current practices, or developing new practices within the existing facilities operation.

At Swarthmore, a facilities staff member has been assigned to the deferred maintenance team on a continuing basis from the program's inception. The assigned member is a working part of the team, and takes the place of what would be the project management firm's assistant site manager. This relationship has proved invaluable in that in-depth knowledge of the campus facilities, facility users, and community culture is constantly available. From the perspective of the college administration, there is daily exposure to and involvement in the planning and execution of the program. This provides valuable training for an employee that the administration feels is capable of continuing the program on a reduced scale when the contract is complete.

In conclusion, it is important to reiterate three important factors when using an outside contractor to manage the reduction of deferred maintenance. First, prepare a needs assessment that is as accurate and detailed as possible. Second, pay careful attention to the selection of the people who will manage the work, since relationships and communication are the basic elements to success. Third, consider the future and, if possible, include training as part of the contract.

Designing and Managing a Capital Renewal Project

Charles W. Jenkins

It's a curiosity to me how capital renewal projects sometimes come to pass. The case of Garni Hall at St. Mary's University was a particularly interesting one. We had identified several hundred thousand dollars in deferred maintenance work for the building, but classes were going on without a hiccup and the building's occupants were quite satisfied with their surroundings. In fact, some of them openly resisted when anyone mentioned that the building should be rehabilitated. Therefore, the capital renewal and deferred maintenance requirements were far down the priority list and not likely to be funded for several years, maybe decades.

So, who would you think got the renovation ball rolling? Was it the academicians who taught in Garni Hall, or their dean, or the academic vice president? No, to all three. Was it the physical plant director appealing for the sake of the deferred maintenance backlog? No again. The instigator was the enrollment management vice president, the student recruiter. His well-stated argument was that prospective students were touring Garni Hall during campus visits and then choosing other colleges, and he had case histories to prove it. (This brought memories of the 1986 Carnegie Foundation report that listed buildings and grounds as the factor that most influenced college selection).

How could a single building's appearance be so important to student recruitment? In this case, the answer is simple. Garni Hall's middle name is Science. Garni Science Hall houses the departments of physics, earth science, and chemistry. St. Mary's University premed graduates are accepted into medical schools at a rate twice the national average, and each year we provide the fourth highest number of minority students to medical colleges, surpassed only by the

University of Texas/Austin, University of California/San Diego, and UCLA. Small wonder, then, that the building where the natural sciences are taught would get great attention.

Why was Garni Hall's appearance such a turn-off? The answer to this is also simple. The building was constructed in 1951 and had undergone no appreciable face-lift in the ensuing thirty-five years. Its atmosphere was reminiscent of Dr. Frankenstein's laboratory.

THE DECISION

In the summer of 1985 our executive council decided that the renovation of Garni Hall was our single most pressing facilities project. That did not mean that all other work was set aside until Garni was done, because our annual deferred maintenance projects continued apace. What it did mean was that every available dollar not already budgeted for deferred maintenance or normal maintenance and operations (that is, any budget surpluses or unrestricted donations) would be saved for the Garni project. It also meant that raising money for the project became one of the top priorities for our development office, which, as I'll point out later, rose magnificently to the occasion.

The first objective was to define a scope of work so that a cost could be estimated and a development goal established. The physical plant department was asked to develop a project scope. At little St. Mary's we have no engineering branch, so the task was essentially mine and my superintendents of building maintenance and central plant operations. Fortunately, we had already documented the building's major deficiencies in our five-year deferred and preventive maintenance plan. Those projects immediately became a part of the overall scope. To fine tune, we asked the three department heads in the building to list the things about the building they did not like, as well as changes that would improve their ability to teach there. Here is the final list of things to be done.

1. Replace steam wall radiators and isolated DX air conditioners with hot water/cold water equipment and connect building to central plant.
2. Replace electrical distribution system throughout building. Add fire alarm system to comply with code.
3. Install suspended ceiling throughout with lay-in fluorescent light troffers. (The building had exposed concrete pan-joist ceilings and 200-watt incandescent light fixtures.)

4. Replace windows.
5. Install new resilient flooring in all classrooms and laboratories; carpet faculty offices.
6. Repaint interior walls.
7. Repair/replace installed plumbing as necessary.
8. Replace chalkboards.
9. Perform structural alterations (relocate walls, doors) as requested by occupants.
10. Replace lab consoles, cabinets, and fume hoods.
11. Water-blast and seal brick exterior.

We presented this list to the executive council, as directed, and then we waited. About a year later, the president called one day to ask for a budget figure for the project. In a memo to him dated December 12, 1986, I priced the project at $1.1 million. For the high-dollar items such as mechanical, electrical, and windows, I had budget estimates from A-E firms and vendors. Those estimates held up well throughout the ensuing three years to project completion. On other items, I had some not-so-good vendor estimates and some educated guesses on my part. Those changed considerably, as I will point out later.

PHASE ONE

The executive council continued to deliberate the project while fundraising efforts went nowhere. After several more months, in the latter part of 1987, I was told to develop an implementation plan for the project. My constraints were as follows:

1. The building must remain available for use during the regular school year. This meant a phased project with construction occurring only during the summer. I figured we could do it in two summers, and we did.
2. Although sound practice dictated performing the building systems upgrade first (mechanical and electrical) and the cosmetic improvements afterward, the order was to be reversed for this project. The university had $600,000 available, and there was no assurance that any more money would be forthcoming. The cosmetic improvements were considered more critical since improving the building's appearance was what drove the project in the first place.
3. Phase One was to be completed during the summer of 1988.

My instructions were to work into Phase One everything that time

and money would permit. Two new requirements had entered the picture since my original scope was defined. First, six rooms in the building had sprayed acoustic ceilings that we thought were asbestos-free. Looking again, we found this not to be the case, which introduced $38,000 in new costs for asbestos removal. Second, since the old DX air conditioners would not be replaced, we had to overhaul them for continued service at a cost of $24,000. What a start! Of the eleven items listed in our scope of work, all but three of them became a part of Phase One.

Now we needed a design. There was nothing complex about any of the work in Phase One. I had my own idea of what the completed product should look like, and was sure I could prepare some simple sketches and statements of work to get it done. The three department chairpersons of Garni Hall, however, had a different perspective. In a December 1987 memo to the president, they stated that "professional planning in the remodeling of science buildings and facilities is imperative and should come first." They staunchly defended that position until they were told that a professional design would use up 8 to 10 percent of the available funds; then they decided they would rather spend the money on furniture or something. I now had the challenge of convincing these three that we could do a good design job ourselves.

For various reasons, I had recently visited some local secondary schools, all of them virtually new. Those buildings became my mental model for the refurbished Garni Hall. One of them was San Antonio's first magnet school. It is for students having the aptitude and interest to pursue a career associated with health care and is aptly named Health Careers High School. Open less than a year at the time, this school had the latest in laboratory equipment installed. One afternoon I loaded the three chairpersons and the dean of science, engineering, and technology into a university van, and we visited three schools, including Health Careers. They were as impressed as I had been, and immediately bought into my plan to model Garni Hall after these facilities. But I had still more for them to do.

In a telephone call to the school district's architect, I learned that all the public school interior walls were covered with a patented spatter-finish paint, then finished with a coat of clear epoxy enamel. This became my bidding standard for the paint at Garni Hall. When the bids for the special, patented paint came in at almost twice my paint budget, I negotiated with the low bidder for a similar system

that came closer to my budget and offered the same appearance. Then I took color samples to the three department heads and each of them chose the decor for his assigned area. My only stipulation was that each of them choose a different color scheme (each department occupies one floor), or that they all choose the same; they opted for the first alternative.

At this time I also gave them color samples of the floor tile that I had selected for the project, and samples of the Formica cabinet fronts available for the laboratory equipment. Finally, since the old, ugly windows were to remain, I also gave the chairpersons samples from which to select decorator blinds. They each presented me with their color-coordinated design for floor, wall, window, and furniture finish. They each did a remarkably tasteful job, and to this day point out to visitors that they performed the interior decoration. It was a public relations coup, and from that time on they felt a part of the Garni renovation team.

Laboratory equipment selection was another interesting adventure. I knew nothing about lab equipment and I had always considered that departmental business. So, in November 1987, I wrote a memo to the dean in which I stated, "I do not intend to become involved in selecting the replacement equipment/furniture. I offer three potential sources for the chairmen, or they may know of other vendors they prefer. At any rate, the matter of replacement furniture and equipment should be thrashed out among you. . . ." Wishful thinking. As time ran out I finally arranged for our local furniture and equipment company representative, from whom I had bought stadium chairs and in whose integrity I had confidence, to visit with each of the department chairs and design new laboratory layouts. It was, by the way, this company's equipment that we saw at the Health Careers High School, and we eventually bought all the equipment from that company. However, while my budget estimate for new equipment had been $150,000, we spent $230,000, this being an area where I had used a vendor estimate for my original budget. I am a lot smarter now than I was; I no longer write memos to deans telling them things I don't intend to do.

The rest of the design work was plain vanilla. To put the lighting replacement work out to bid, I simply marked a floor plan of the building with the number of fixtures to be replaced in each room and specified two-foot by four-foot lay-in fixtures with four 40 W cool white fluorescent tubes per fixture. During a pre-bid walk-through with the three invited bidders, it became apparent that some loca-

tions would require surface-mounted fixtures instead of lay-in, so we changed this on the spot.

The floor covering and ceiling contracts were not bid at all. I just negotiated with firms who had done previous renovation work on the campus and who, when bidding competitively, had consistently been successful. I delegated the asbestos removal work to a staff member who is licensed to supervise such work, and he took bids from two local firms that had done satisfactory work for us before. The plumbing, chalkboard replacement, and exterior surface repair work were negotiated; the interior structural work was bid.

My post-design revised budget estimate for Phase One had been $541,000. Some of the actual contract prices were lower than the budget figure while others were higher. The project total, after award of contracts for the work, was $528,109.

It may be obvious from the way I've been discussing our negotiations with subcontractors that we had elected to do our own construction management. In recent years we had done several smaller renovation projects, and each time had hired a general contractor. For this project, the time constraints and generality of the design documents (should I say haziness?) convinced me that we should work directly with the subcontractors. This avoided the general contractor's mark-up and made it exceedingly simple to effect on-the-spot change orders.

There was one other consideration. We had recently added to our staff a maintenance technician who had spent the previous fifteen years as a construction inspector for the University of Texas system. In addition to holding a master plumber license, he had proven to be an excellent craftsperson who worked well with little supervision. After we determined that we could cover his normal assignment during the three summer months with other technicians, his supervisor and I approached this technician to see if he would consider being the university's project boss at Garni Hall. He agreed to the assignment, even before I mentioned the bonus he would earn by performing a service of greater responsibility than his normal duties. Thus was the stage set for the accomplishment of Phase One during the summer of 1988.

One of my first moves after electing to be the general contractor was to put a $10,000 line item in the budget for expenses associated with that responsibility. We knew we would need trash collection service, significant demolition of old laboratory equipment including fume hoods, and labor to assist subcontractors from time to time.

Since the building could not be emptied for construction, we also required a moving crew to relocate departmental equipment in hopscotch fashion to keep it out of the contractors' way. On the day after classes ended in May 1988, four temporary laborers joined our staff and were placed under the supervision of our project boss; we had already used project funds to buy moving equipment for their use. After the initial surge of activity, which included helping the departments pack things away for the summer and wrecking out three large chemistry laboratories, the most industrious of the four laborers was selected for a permanent position on the grounds staff. We continued with only three, and finished the summer with two. They supplemented the housekeeping staff, who had to clean up the facility after construction, and even stayed on for a few weeks after school started to help the departments unpack and settle back in. Hiring this crew to handle the day-to-day chores proved to be one of the better moves we made.

While we provided labor to help the occupants pack and store things, we also urged them to remove from the building any valuable possessions. We insisted that all hazardous materials be stored in a single locked room, which we then marked conspicuously and allowed contractor personnel to enter only under our supervision. Fortunately, we had no one injured on the job for any reason. Unfortunately, despite our best efforts to secure departmental equipment, we did have some breakage and unexplained disappearance. Replacement was an expense borne by the general contractor fund.

Our time-phased plan called for work to begin on the third (top) floor and proceed to the first. Phasing of the work was to be asbestos removal, ceiling and light installation, painting, floor covering installation and, finally, laboratory equipment installation. Since only parts of the building had to be isolated for the asbestos work, it was possible for other work to go on concurrently. The exterior cleaning and chalkboard replacement did not interfere with the other work and so could be done whenever convenient. The window blinds would be installed last.

We now had a plan and resources. All that was left was to execute, which occurred between May and September of 1988. There is nothing exceptional to report except that my project boss and his crew logged a lot of overtime that summer. We had the usual concerns about time as the summer drew to a close, but eventually finished on time and on budget—almost.

Earlier in this chapter I alluded to my ignorance about laboratory

equipment. That ignorance eventually caused the project to exceed budget. The furniture and equipment company's quote for laboratory equipment contained the language, "Our price is delivered, unloaded, and installed. Our price excludes traps, drainlines, blowers, internal piping, wiring (under, along, through, or above work surfaces), and conduit." Oh well, I thought, I'll hold back a few thousand dollars. What can a little plumbing cost? As the project progressed, things were going well and staying right on budget. Since I had $600,000 to do a project estimated at $541,000, there was a contingency, or betterment, fund available. It looked like there would be no contingencies, so I suggested that we use some of the money to buy classroom furniture, none of which was in the original project. The administration approved, so I spent about $17,000. Then came the day when the laboratory furniture was "delivered, unloaded, and installed." Guess what still had to be done to make it usable: $5,100 in additional plumbing work, $14,000 in electrical, and $28,000 to furnish, install, and balance the blowers for fourteen new fume hoods. Goodbye, betterment fund.

Garni Hall opened on schedule in late August to rave reviews. As the semester progressed I continued to receive memos and calls as the occupants discovered missing and broken equipment, and I replaced every piece without a murmur. When we closed the books on Phase One in April 1989, an accounting ledger showed total expenses of $623,818 or about 4 percent over the original budget. I was able to alibi to my boss that my mismanagement had only resulted in the purchase of unbudgeted things which, in the long run, made for a better project anyway. He bought it, and everyone was happy—and looking forward to Phase Two.

PHASE TWO

As the fall of 1988 came and went, it was touch and go whether we would find the money for Phase Two. Our development people had been beating the bushes unsuccessfully for over a year. Then an interesting thing happened. When our administration committed university funds for Phase One and we got that work under way, prospective donors who had previously been lukewarm began to show interest. The gesture of earnestness on the part of St. Mary's made the difference. The breakthrough came early in 1989 when the J.E. and L.E. Mabee Foundation of Oklahoma issued a challenge grant to the university of $300,000, or half the amount required for

Phase Two.

With this impetus, the fundraisers redoubled their efforts. An alumnus who had taken many courses in Garni Hall and then did well in the semiconductor manufacturing business made a donation of more than $100,000. There were several smaller gifts. The last few thousands were secured by convincing people who had made undesignated gifts and pledges to instead earmark them for Garni Hall. Finally, just as we were running out of time, the challenge was met and we had the Phase Two funds in hand or pledged. Although our donors did not give for a "memorial roof," they did give their money with the full knowledge that it would buy air handlers, electrical outlets, and windows. We now know that while it is sometimes difficult, it is not impossible to raise capital renewal money through development efforts.

The critical task for Phase Two was design of the HVAC and electrical upgrade. Because I knew that we could not tackle that one without professional help, we had already retained the mechanical consultant in November 1988 to begin design of the mechanical and electrical renovations. We decided that even if we didn't get the money to do the work, it wouldn't hurt to have a completed design on the shelf. In a letter dated April 3, 1989, I notified the consultant that the administration had finally given the green light to proceed, and reminded him that the contractors had to be cleaned up and gone by August 18.

Selecting the type of HVAC equipment to install in Garni Hall presented a dilemma. The building is laid out with all classrooms and laboratories on each floor opening directly onto a long central corridor. Having a single mechanical room for the building or even one per floor and ducting conditioned air to and from the occupied spaces was not feasible. Once again, we went to the local secondary school system for a solution.

In the early 1980s, the citizens of San Antonio recognized a great inequality in the city's schools and voted a multimillion-dollar bond issue to air-condition the school buildings in the poorer school districts. These facilities had been built decades earlier when environmental control was not considered an issue and so were provided only with heating, just like Garni Hall. We visited several nearby schools where mechanical work was under way and found that the preferred installation was one or more hot water/chilled water fan-coil units in each room, with a network of water piping serving the building from a centralized pump room. That was exactly the solu-

tion we needed for Garni. Not only that, the consultant with whom we were working had designed over half the school district projects. He got busy with our design and on May 12, 1989 we opened bids for the combined mechanical-electrical project. To our delight, the low bidder was one of San Antonio's leading mechanical contractors and one we regularly called upon for utility repairs and central plant modifications.

Not only did our choice of equipment best suit the building layout, it solved another dilemma I had been facing. From the very onset of discussion about renovating Garni Hall, one particular department chairperson had been vociferous in opposing central heating and cooling. He adamantly defended the window air conditioners that protruded from the outside walls like warts and would not hear of having them replaced. He was convinced that central air conditioning meant that, just like in this home, the air conditioning for the entire building would come on and go off at the same time. How wasteful, he argued, when often only one room is occupied. Try as I might, I could not convince him that the controls could be arranged so that zones, or even individual rooms, could be environmentally controlled to the exclusion of the others. Enter our central plant superintendent, who handled the situation admirably.

In a meeting with the three department chairpersons, our superintendent explained that the fifty-six rooms and three corridors in the building would be equipped with a total of seventy-seven individual fan-coil units. Each would have the thermostatically controlled valves and dampers common to four-pipe, two-coil equipment. Each regularly scheduled classroom and laboratory would have a thermostat to automatically control the units therein depending upon the heating or cooling load. Offices and small workrooms would have manually controlled units. As a further energy conservation assurance, the entire building would be tied into the campus energy management system so we could, from the central plant, duty cycle the equipment and set back temperatures at night and on weekends.

"What's that you say? Control our building's temperature from somewhere else? We never had that before! What if we come to work on a weekend or stay late during exam week?" They had all the standard concerns of occupants whose building is just going on the EMS. Fortunately, our superintendent was prepared. He had devised an ingenious system of override timers and, in concert with the department heads, agreed to install three per floor with each timer controlling one of three zones chosen by the occupants. Thus, any

time the EMS has the building in a setback mode, the override timer can be used to bring the temperature back to the comfort level. When an override timer is set, the EMS immediately takes notice, opens the appropriate valve, and starts the associated house pump. When the individual who activated the timer leaves, he or she can zero it and return the building to setback. If someone forgets to zero it, the timer does this automatically after two hours.

The design of this system, as well as the building/EMS interface, resulted from a close cooperative effort between our superintendent and the design engineer. They both learned something in the process, and the Garni Hall occupants got a control system that has delighted them to this day. Once highly skeptical of being on the campus central system, they now would have it no other way.

The electrical renovation consisted mainly of replacing two-conductor wires, receptacles, and switches throughout the building with a grounded system. All distribution panels were replaced and several circuits added to accommodate the new lab equipment which had been installed the year before but was being underutilized because of inadequate electrical service. A fire alarm system was added as required by code. During the course of the project the electricians discovered deficiencies in the building's main service panels, and these were corrected by change order. The result was a safer, more reliable electrical system with ampacity sufficient to serve the building's foreseeable needs through the turn of the century.

For Phase Two we not only elected to turn the design work over to professionals, but we also passed up the opportunity to be general contractor. The lion's share of the required work was mechanical and electrical, so we wrote the contract to make the mechanical contractor the prime contractor and responsible for the electrical subcontractor. Thus, all the busy work that had been our project boss' headache during Phase One became the mechanical contractor's responsibility in Phase Two. The day-to-day surveillance and owner/contractor interface activity passed to our central plant superintendent. He was superlative at keeping things on track.

We did impose on the mechanical contractor somewhat when we ordered the windows replaced, but our window installer was careful to stay out of the way and so caused no great coordination problem. Working primarily from outside the building (concrete eyebrows allowed this to happen on the upper floors), the window vendor removed the building's original metal casement, jalousie style windows and replaced them with double-hung, aluminum frame sliding

windows having a bronze-tinted glass pane. Not only was the building's energy efficiency improved by removing the warped, leaky windows, but the improvement in fenestration was dramatic. Of course, it's debatable whether the new windows or the disappearance of the window air conditioners was most responsible for this improvement, but, in either case, praise came immediately and profusely.

If you're wondering how all the pipe, conduit, and equipment installation was carried out in a building just one year away from a complete cosmetic upgrade, the answer is—very carefully. By covering walls, floors, and equipment with protective sheeting and taking extraordinary care to keep the workplace clean, the contractors managed to do very little damage, and what damage did occur they repaired. One way we helped was to remove and store the approximately $10,000 worth of decorator blinds before the contractors moved in. After the contractors left, we rehung the blinds, and that was the extent of the physical plant department's participation in Phase Two. Except, of course, for the housekeepers who had to bring the building from "contractor clean" to "St. Mary's clean" before classes began. As usual, they made me proud.

The final tab for Phase Two was just under $700,000, broken down as follows: mechanical-electrical contract, $488,518; A-E fee, $46,700; windows, $158,873. The renovation fund was able to pick up the overrun with earnings it had gleaned through sound investment. So, the project I had estimated at $1.1 million in 1986 before the first pencil had touched a design board, actually cost $1.3 million by the time it was completed three years later. I attribute the 18 percent variance primarily to scope that was added during the project and to inflation. The added requirements came about either because of unanticipated conditions we found during construction, or because we simply elected to do extra things. Fortunately, I am allowed to free-wheel a bit in project management, as long as I keep my boss informed and get his approval prior to doing anything really drastic. I realize that many managers do not have that latitude and might consider this a tale of incredibly sloppy management. However, it worked well for us at St. Mary's, and if it's sloppy we'd rather not know.

In the fall of 1989 the development people held a formal reception and ribbon-cutting at Garni Hall, primarily to honor the donors who had made Phase Two possible. It included a slide show of "before" pictures, and was a great success. Each donor received a matted and

framed photograph of Garni Hall as a memento. There was one left over that I arranged to give to our Phase One project boss, who had long since returned to his maintenance duties. He is still proud, and rightfully so, of his contribution to the project.

CONCLUSION

I hope that reading the story behind the renovation of Garni Science Hall has provided an idea or two that can be applied at other institutions. There are four things that I think were innovative about this project.

The first was our decision to do our own design, contracting, and construction management for Phase One. The design was simplified by copying something others had done, and by dealing directly with subcontractors we saved money that later became added scope. By acting as construction manager and being present on the job-site every day, we were able to keep the project on schedule and quickly process change orders.

Second, by letting the occupants design the interior of their assigned spaces we earned their good will and made them an important part of the overall effort. We took the chance that they had good taste, and they proved us right.

Third, we proved that donors will support a drive for a "memorial roof." Our commitment to the project, as evidenced by undertaking Phase One with university resources, convinced the high rollers to get on the bandwagon for Phase Two.

Fourth, the override timer scheme for controlling the temperature in the building was a simple but highly effective way of addressing what could have been an emotionally charged issue. In the two years since Phase Two was completed, the controls have operated to everyone's satisfaction.

I would like to add one final thought. Writing this chapter almost five years after the first seeds of the Garni project were planted, and going through the files to recreate the experience, has been fun. But actually doing it was more fun.

Maintaining a Tradition of Facilities Support

Clara Anne McKenna & Philip G. Rector

Giving maintenance and physical plant operations the consideration they deserve is part of a tradition that was rekindled at Colorado College more than thirty years ago. It has its deeper roots in the position of excellence that the school established in the nineteenth and early twentieth centuries.

When Gresham Riley became president of Colorado College in 1981, he came to a successful institution. He believed that the key to continuing the tradition was comprehensive planning, so that the college could maintain its resources and continue to strengthen the infrastructure, including the condition of its physical plant.

While instructors sometimes think that higher education is a professor on one end of a log and a student on the other, Riley feels that that perception is unrealistic. "It is the president's responsibility," he said during an interview, "to care for things that make teaching and learning possible but are not teaching and learning themselves. A well-maintained physical facility is a necessary condition for the college's fulfilling its central educational mission."

A campus in good condition not only helps recruit students and raise money for academic programs, it also creates excitement and enthusiasm among volunteers. Whether a member of the board of trustees or an alumnus returning for the first time in fifteen years, a sense of being part of a healthy institution raises morale and makes these volunteers want to be part of maintaining a tradition.

HISTORY OF A TRADITION

Colorado College is an independent, coeducational, liberal arts college in Colorado Springs, Colorado. Established in 1874, it has committed itself to undergraduate instruction in the arts and sciences.

Like its home town, the college is the product of America's great reach westward, via the railroads and the missionary zeal of the Protestant faiths.

Colorado Springs lies at the base of 14,110-foot Pike's Peak. The community was established by General William Jackson Palmer, a veteran of the Civil War who eventually organized the Denver and Rio Grande Railroad. As part of his vision of a model city, Palmer saw the need for an institution of higher learning. When the Conference of Congregational Churches in Colorado Territory decided to open a school, Palmer's Colorado Springs Company offered the church leadership land and money to locate in Colorado Springs.

After the usual challenges of starting new entities, Colorado College and Colorado Springs boomed in the late nineteenth century. The discovery of gold in nearby Cripple Creek made the city a hub of mining activity in the West. It also created a number of millionaires who would provide major support to Colorado College in the years to come.

College enrollment increased steadily, and the campus became the cultural center of the area. Fundraising and building proceeded apace, as the school added eight buildings in eleven years. Observers of the school give much of the credit for the expansion to President William F. Slocum, who led the institution for twenty-nine years, from 1888 to 1917. In 1907, trustees amended the college's charter to sever its ties with the congregational churches.

Slocum's departure coincided with a change in the fortunes of the area as the gold rush ended. Colorado Springs would not prosper again until after World War II, when it became the home of the U.S. Air Force Academy, the North American Air Defense Command, and the army post Fort Carson. Colorado College, although it held its own, would not see a renaissance in planning and leadership until the arrival in 1955 of Louis Benezet, its eighth president.

RENEWING A COMMITMENT TO FACILITIES

Benezet inherited a school with a strong tradition of excellence, but one that had suffered mightily from the deprivations of the Great Depression, the chaos of World War II, and attacks on education during the McCarthy era. Patterns of campus maintenance were spotty. While Shove Chapel, built in 1931, had been endowed with a substantial fund for maintenance, the old heating plant was on its last legs. By all accounts, physical plant manager R.A. Kendrick expected

the boiler to blow up every time it was fired.

Before he could deal with issues such as faculty salaries, curriculum, and student life, Benezet believed he had to get the place looking like a serious educational institution. That meant taking care of basics that had been neglected, such as cutting the grass. In some places, grass had to be planted first, since a drought from 1952 to 1954 had ruined much of the school lawn.

THE WILLIAMS HEATING PLANT

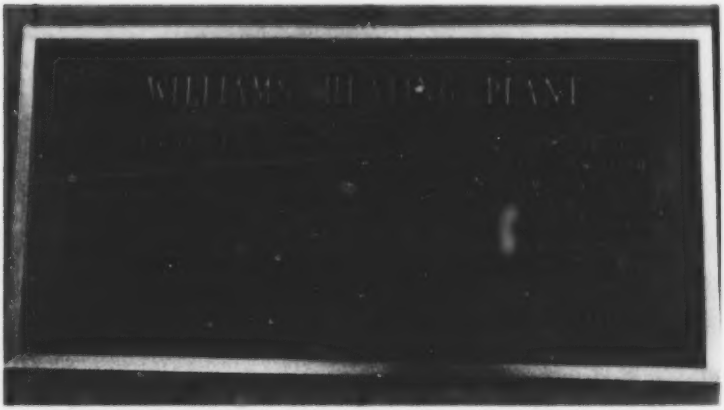
The need to replace the coal-fired heating plant became more acute as plans were made to upgrade the school with significant new construction. The need became critical when the Pikeview Quarry, the last active coal mine in the area, closed in 1957. Aware that there was no money available in the operating budget for a new plant, Benezet, Kendrick, and Russell Tutt, a member of the board of trustees and a trained engineer, went to work in late 1959 to plan and pay for the $500,000 facility.

This was a tremendous financial undertaking. By comparison, the Rastall Student Center, also under construction, would cost only $800,000. On the day the resolutions for the heating plant passed the board of trustees, the agenda included authority for the business manager to increase room and board for summer school from $160 to $180.

The new system produced heat with high-temperature hot water generators, with converters at each major building on campus. It required a new boiler house and maintenance tunnels, and had to be on-line by September 1959 to provide heat and hot water to the new student center under construction. Although consideration was given to coal, the boilers finally chosen used natural gas. A backup system using heating oil also was installed because the city utilities department supplied gas on an interruptible basis; little oil was used in subsequent years. The new system resulted in a 58.5 percent savings in fuel costs during the first full year of operation.

Tutt and Benezet began beating the bushes looking for foundation and private donors. They were assisted by the vice president for development and the business manager. The president approached one foundation to request assistance, only to draw back when the organization indicated that its gifts would be tied to using a particular contractor.

Colorado College returned to its roots to find benefactors. When it



THE COLORADO COLLEGE

A commemorative plaque recognizes donors to the Williams Heating Plant.

was dedicated, the unit was named the Williams Heating Plant to acknowledge a $100,000 bequest of the estate of Leon Williams, a friend of the college. Williams left the money in memory of his four sisters, three of whom had attended the school.

El Pomar Foundation—created by mining magnate and Broadmoor Hotel founder Spencer Penrose in 1937 to encourage education, science, art, and religion in Colorado—contributed $150,000. William and Helen Jackson, who had graduated from Colorado College in the early part of the century and who were children of one of the founders of Colorado Springs, were among the alumni donors, as was Oklahoma publisher E.K. Gaylord, class of 1897. Both William Jackson and Gaylord served the college as trustees. The Bemis-Taylor Foundation and Colorado Interstate Gas, headquartered in Colorado Springs, also were substantial donors. The final cost of the new heating operation was $528,376.31.

THE RENAISSANCE OF THE CAMPUS

The college embarked on a flurry of building and fundraising activity. By 1962, a new science hall and library were being completed as Benezet announced that the Ford Foundation had awarded the college a $2.2 million challenge grant, if the institution could raise an additional $5.5 million by 1965. Again, those with roots in the col-

lege responded. Among them was the Jackson family, which sold its ancestral home to the city of Colorado Springs and donated half of the proceeds to the campaign. In addition, the Kresge Foundation contributed $25,000.

The college continued the tradition of restoring the physical campus to excellence under Lloyd E. "Lew" Worner, who succeeded Benezet in 1963. Worner had been dean during Benezet's tenure, and he hit the ground running. Honnen Ice Rink and Schlessman Pool honored the families of men who had prospered since leaving Colorado College—Honnen (class of 1921) as a contractor and Schlessman (class of 1917) as an investment banker and utilities executive. A new residence hall, humanities and administration building, and health center were completed between 1962 and 1966. These projects were financed by foundation grants and gifts from friends of the college and the Woman's Educational Society (WES), founded by William Slocum's wife in 1889.

The importance of maintaining basic physical facilities to impress donors was underscored by an accident during this period. Designers added central administrative offices to plans for Armstrong Hall, the humanities building, after Dr. Charles L. Horn, president of the Olin Foundation, banged his head on overhead heating pipes on his way to the men's room in Cutler Hall, the old administration building. The foundation donated $2.5 million to Armstrong Hall's construction.

In 1968, Colorado College acquired a gem—the Van Briggle Art Pottery building, the manufactory and showroom of Artus Van Briggle, a well-known artist of the nineteenth and early twentieth century. The building was purchased primarily with funds from the Boettcher and Kresge foundations. Both organizations were notable for their interest in financing "bricks and mortar" during this period.

The ornate building is constructed of brick and one-of-a-kind Van Briggle tiles, and is further distinguished by two chimneys that are sixteen feet in diameter at the base that were part of the original kilns used to fire pottery. In 1970, the structure was remodeled as working space for the physical plant staff. In 1990, the staff restored the external structure to its former glory, removing unused utility sheds to expose the intricate tiles, and repainting the trim on the building its original color.

In 1971, Worner received an unexpected call from David Packard, deputy secretary of defense under Richard Nixon and one of the founders of the electronics giant Hewlett-Packard. He informed

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The Van Briggle Art Pottery building now houses physical plant offices.

Worner that Colorado College was the chief beneficiary of the proceeds from a blind trust that held his stock during his service to the government. The unrestricted grant—156,000 shares of Hewlett-Packard stock—had a market value of $6.8 million. By the time the stock was gradually liquidated, its value had increased to more than $12 million.

Although Packard had attended Stanford University, he had strong ties to Colorado College. His parents were members of the class of 1902, and his father had been one of the first trustees elected to the board by members of the alumni association. David Packard also served on the board after he received an honorary degree in 1964. Approximately one-third of this money was used to build a new music and art building, dedicated to Packard's parents. The balance established another endowment fund to support a number of items.

Worner continued his direction of fundraising during this period. Because of his efforts, El Pomar Foundation funded a 24,000-square-foot addition to Tutt Library in 1979, enhancing a building it had originally financed in 1962. In addition, a fundraising campaign

sparked by the Packard gift, named the Centennial Campaign in honor of the school's 100 years of operation, was successful.

THE IMPORTANCE OF PLANNING

When Gresham Riley became the tenth president of Colorado College in 1981, Colorado Springs entered a boom-and-bust period much like those of the gold rush days. The city's start as the potential home of the Strategic Defense Initiative (SDI) and a center of the electronics industry caused the population to surge 25 percent, but faltered in the latter part of the decade as world events and federal budget deficits signaled a shift away from heavy government spending.

A comprehensive campus facilities plan for Colorado College, commissioned by Riley early in his presidency, worked to insulate the college from the difficulties around it. The 1983 plan was completed by a Massachusetts firm that specialized in comprehensive planning for colleges and universities.

As the plan was being written, Riley observed, "There was an interesting change of attitudes on the part of donors or potential donors." Ten to fifteen years earlier, money for bricks and mortar had been easy to raise: "There was something tangible about buildings, people could see the money put to use." In the 1980s, "It was now the most difficult money to raise. People were now interested in scholarship and programs, such as faculty professional development and money for strengthening faculty salaries."

Still, during this period the college raised substantial money for a new science center and renovation of the existing science space, as well as a new student center. In fact, the Colorado College Campaign, the most ambitious fundraising campaign in the school's history, raised $49.9 million between 1984 and 1989, $6.4 million more than its goal. The money came from a number of sources, including grants from the Kresge, Boettcher, Gates, W.M. Keck, and El Pomar foundations and the Pew Charitable Trusts. Smaller gifts for the science building also came from hundreds of alumni who had been science majors. Another heartwarming component of the campaign was the decision of a group of former football players to raise about $350,000 to construct and equip a weight room and fitness center in honor of Jerry Carle, longtime coach and athletic director.

The comprehensive plan that Riley commissioned makes physical well-being a part of a vision of overall excellence. For example, the

report identified the campus as essentially landlocked with less than eighty acres for a student body of 1,850, and identified strategies for expansion. It offered detailed recommendations on siting and planning the science center, and described the condition of the thirty-six major structures on campus. This plan provided the basis for long-range maintenance plans.

CONCLUSION

Colorado College has opted for planned renovation—exactly the opposite of deferred maintenance. Two five-year plans, plus maintenance programmed in advance of need, have been implemented since 1980 by the three physical plant directors who have served in this period, working with the director of residential life and the dean of the faculty. The current phase, an upgrade of the residence halls, will cost almost $9 million.

The college recently completed a report entitled "The Colorado College Priorities for the 1990s." One of the four main categories is physical plant, an emphasis that is not brought about by concern about neglect, but is instead based upon a commitment to retain the relative soundness of the facilities. To quote from the report:

> Annual maintenance and updating has kept the physical plant in good overall condition. Even so, many of Colorado College's historic buildings are nearing their hundredth anniversary; other key facilities are forty-five to fifty years old. We caution against ignoring our physical plant even during a period of relative fiscal restraint. Many institutions now find themselves with buildings and grounds badly in need of repair but with insufficient funds to accomplish the task. It would be unfortunate to find ourselves in that predicament at the close of the 1990s. Neglect of the physical plant simply is not prudent.

Maintenance money in these tight times comes in part from restricted and unrestricted grants. But inevitably, much of it is derived from tuition. President Riley believes that the institution and its leaders must make the commitment to physical excellence: "It's easy to decide to use financial resources for other purposes. If the leadership of the college doesn't make a conscious decision to put re-

sources into keeping the place in shape, it's not going to happen. There has to be a recognition of that." At Colorado College, "the physical plant is in good shape—excellent shape. We plan to keep it that way."

Presenting Your Case to Board Members

Michael Besspiata III

Preparing and presenting a deferred maintenance plan is an essential element in making facilities needs known to trustees or board members. The specific deferred maintenance needs and their associated costs—along with the potential results of failing to address those needs—need to be imparted to decision makers. Success in obtaining funding depends greatly upon how well the facts are presented to the people who need to know.

DEFINING NEEDS

The first step is to define deferred maintenance needs. The process begins by determining the areas to include, and progresses to a clear definition of specific needs within those areas. The best sources of information for defining these needs are the facilities supervisors and staff, the housing director, and department heads. These people have firsthand experience working with (or around) worn-out facilities and equipment.

Once the list of deferred maintenance needs is established, each need can be ranked according to how soon the work needs to be accomplished. This list of priorities becomes the maintenance plan. Southern Baptist Theological Seminary established a five-year plan to meet most of its needs. Several items were not included because the period for their replacement was beyond the scope of the five-year plan; a ten-year plan is currently being prepared. Some institutions may need a two-, three-, or four-year plan for replacements or repairs to prevent major failures in equipment or building components.

DETERMINING COSTS

The next step is to determine the costs associated with each deferred maintenance item. These costs could be estimated or "not to exceed" costs, but they should not be inflated. If a specific need is to be addressed one or more years in the future, allowances for inflation should be added.

It may be necessary to make some adjustments in the priorities of deferred maintenance needs after the costs are established. The costs for any one year may turn out to be exorbitant, and funding may be more likely if lower figures are requested within a given year. Of course, there are some needs that cannot be delayed due to the extent of damage or their importance to facility operation. But some items can probably be delayed a year or more to allow for a more balanced annual budget request.

CHOOSING THE FORMAT

To provide for a fluid presentation, a format needs to be chosen for the maintenance plan document. For example, the institutional goals could be used as guidelines and all deferred maintenance needs organized in categories oriented toward those goals. Another solution is to use the building needs as guidelines, or to present the needs by department.

As with any opportunity to make a point, the more pertinent the data or documents, the better the chances that the needs will be acknowledged. Caution should be exercised not to overburden the audience with facts; include only the most beneficial information. For example, a significant factor in deferred maintenance is the age of the facilities. Charts showing building age or latest renovation dates are important, as are building square footage, construction styles and materials, and the original intent of the building when constructed. Other pertinent information could include the following:

- Statements showing rental income versus maintenance costs for various buildings; often the cost of upkeep approaches or exceeds income.
- A list of current needs of buildings, detailing their impact on living conditions or functional use.
- Charts showing annual increases in maintenance costs compared to inflation rates. These demonstrate that nominal or no annual

increases in operation expenditures may not be enough to prevent further deferred maintenance problems.

- Reports of equipment breakdowns, detailing the age of equipment, the impact of downtime on the facilities, and the costs of repairs.
- Formulas that show recommended spending per square foot, or any other spending formulas that enhance your position in requesting funding.

All of these documents can be gathered together into one master unit plan, with formats and guidelines for presentation. This information now becomes the basis for the deferred maintenance plan.

ESTABLISHING PRIORITIES

At this point, a priority of need can be established, keeping in mind the priorities already identified in the maintenance plan. At Southern Baptist Theological Seminary, the following priority codes are used:

- Five (5) = Critical. Needs to be repaired or replaced immediately. Any further delay could result in extensive costs or damage.
- Four (4) = Important. Needs to be repaired or replaced as soon as possible. No immediate danger, but requires attention.
- Three (3) = Needed. Should be done upon allocation of funds. Parts or structure can endure for approximately eighteen months before requiring immediate repair or replacement.
- Two (2) = Basic. No immediate need, but work is required to maintain integrity of structure, product, or specific item.
- One (1) = Desirable. No current need, but would be an improvement to existing situation.

An optional item to add to the deferred maintenance plan is an indication of the life term of the requested items. Information about how long the parts, materials, and equipment will last after their initial purchase could have a bearing upon whether or not a particular need will be addressed. Again, as with the priority codes, different time periods can be used. The periods used at Southern Baptist Theological Seminary are 15+ years, 7+ years, and less than 7 years.

To create the presentation copy of the deferred maintenance plan, a computer spreadsheet may be used. Column headings could include building name, item, cost, life term, priority, or any other pertinent information. This information can be sorted into the most useful format for presenting deferred maintenance needs. The final printed report can then be distributed to targeted individuals.

PREPARING SLIDES AND VIDEOS

Another way to present the plan to trustees or board members is an audiovisual presentation. This can be in the form of a video or slide presentation, or a combination of both. Southern Baptist Theological Seminary decided to produce a slide presentation because it can provide better detail and more data in less time. Slides also permit easier editing and scripting, and require less production time. As with the printed presentation, the format must first be determined (buildings, categories, priorities, etc.).

Using our written notes, we toured our facilities with a photographer and took pictures of all our deferred maintenance needs. We took several shots of each item from different angles. We then sorted through the slides to find the most unique or interesting pictures, and sorted them by category.

We then wrote the script for the presentation. We kept the information in the script short and to the point. We decided that it would be best to keep the presentation under fifteen minutes in order not to lose our audience's attention.

We used a portion of APPA's video, *The Decaying American Campus—Defining the Problem*, to open our deferred maintenance presentation. The video details the problem on a national scale and emphasizes the need to correct it. This was followed by our slide presentation that brought the problem home with specifics about our needs. This presentation was well worth the time spent preparing it; it presented our deferred maintenance needs to the board of trustees in a way they could understand. The process of funding those needs is currently under way.

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